Spacelabs Medical
An OSI Systems Company

Ambulatory Blood Pressure Report Generator/Printer

90239A

Service Manual

070-0398-00 Rev. D

more time to care

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Rx Only **US Federal law restricts the devices documented herein to sale by, or on the order of, a physician.**

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Introduction

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Overview

The 90239A Ambulatory Blood Pressure (ABP) Report Generator assembles raw blood pressure data collected by the 90207 ABP monitor into tabular and/or graphical reports. This information can be printed immediately or transferred to data cards for storage and for printing at a later time. A battery backed-up real-time clock/calendar and memory store the configuration setups.

A card slot in the front of the Report Generator (refer to *Figure 1-1*) accepts the following:

- a program update card (for changing the program contained on an internal Flash ROM),

  -OR-

- a data card (for storing patient data retrieved from the 90207 ABP Monitor).

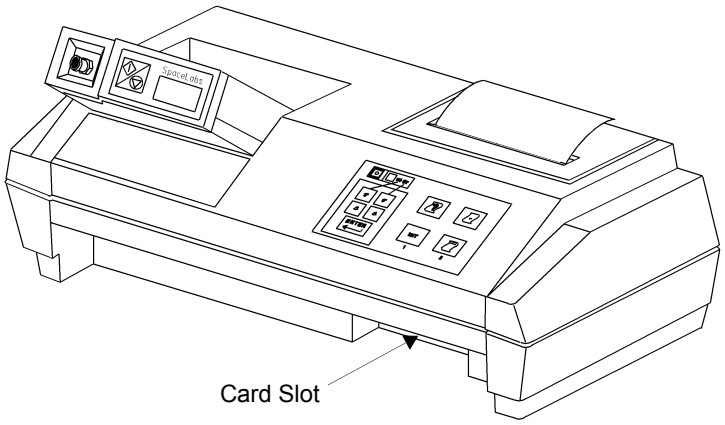

Figure 1-1: 90239A ABP Report Generator

Specifications

Physical

Height:	3 inches (7.6 cm)
Width:	10 inches (25.4 cm)
Depth:	6 inches (15.2 cm)
Weight:	1 lb 6.2 oz (0.63 Kg)

Power

120 Volts AC/9 VDC, 800mA adapter (P/N 334-0264-01)

240 Volts AC/9 VDC, 800mA adapter (P/N 119-0125-00)

Operating Environment

Temperature:	+50° F to +104° F (+10° C to +40° C)
Relative Humidity:	0% to 95% non-condensing
Altitude:	-500 to 10,000 feet (-200 to 3900 meters)
Vibration:	0.025-inch (0.635mm) displacement in all three axis from 10 to 60 Hz

Non-Operating Environment

Temperature:	-29° F to +149° F (-34° C to +65° C)
Relative Humidity:	0% to 95% non-condensing
Altitude:	-500 to 10,000 feet (-200 to 3900 meters)
Vibration:	0.025-inch (0.635mm) displacement in all three axis from 10 to 60 Hz

Radio Frequency Interference

Standards

VDE:	0871, Class B
FCC:	Class B

Control Panel Keys

The user enters requests to the Report Generator by using two groups of keys located on the front of the unit (refer to *Figure 1-2*). These keys are fully explained in the *90239A ABP Report Generator Operations Manual* (P/N 070-0399-xx).

- Use the group of four keys on the right to immediately execute a function.
- Use the group of five keys on the left to program the ABP Monitor.

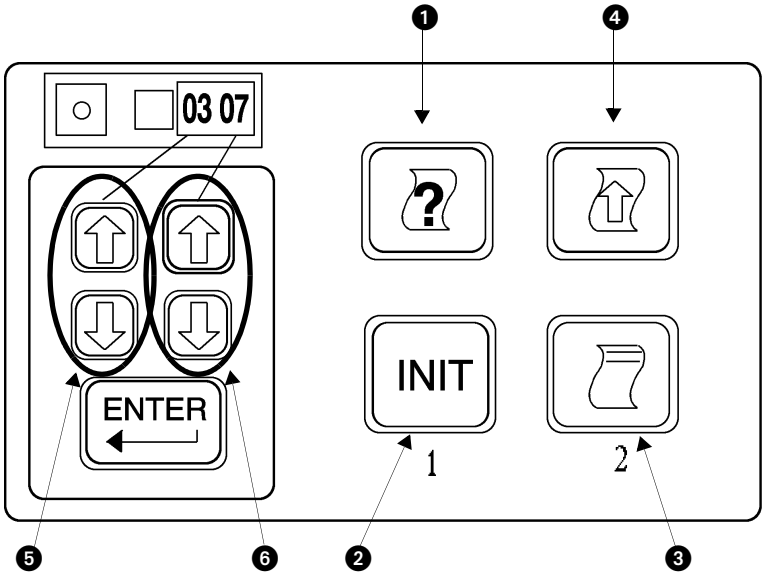

Figure 1-2: Control panel keys

1. HELP (symbolized by a question mark on a sheet of paper)
2. INIT (pressing this key initializes the ABP Monitor)
3. PRINT (symbolized by a sheet of paper containing two lines of text)
4. PAPER ADVANCE (symbolized by a sheet of paper with an UP arrow)
5. The left pair of UP/DOWN arrows affect the two left-most digits on the ABP Monitor display
6. The right pair of UP/DOWN arrows affect the two right-most digits on the ABP Monitor display

Installation and Set-up

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Overview 1
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Removing Paper 1
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Overview

The Report Generator is shipped from the factory with the required software and hardware already installed. The unit requires only an ABP Monitor and electrical power to function.

Loading Paper

Caution

Use only Spacelabs Medical thermal paper (P/N 006-0210-02) in the printer; the print mechanism may be permanently damaged if other brands of paper are used.

1. Orient the paper roll so that it feeds from the bottom, and then fold the left side of the paper over so that the right side forms a point.
2. Remove the plastic cover over the cradle, and then feed the point through the slot in the bottom of the paper roll cradle until it emerges in the print area (the paper must feed from the bottom of the roll).
3. Pull the paper through until the fold clears the print area. (A pair of tweezers may help you perform this step.)
4. Feed the paper up through the slot in the printer cover.
5. Replace the plastic cover. This cover MUST be in place during printer operation.

Removing Paper

To remove paper from the Report Generator, pull the paper in the direction of normal paper movement.

Caution

DO NOT pull the paper backward through the printer. Reversing the normal direction of paper movement may permanently damage the paper-feed mechanism. Refer to the *90239A ABP Report Generator Operations Manual* (P/N 070-0399-xx) for further information and instructions.

Power ON Self Test

Each time the Report Generator is powered ON, it tests its RAM and ROM areas. After a successful self-test, the Report Generator prints a message similar to the following:

If an error message prints out, refer to *Troubleshooting* on page 4-1.

Theory of Operation

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Input/Output

Report Generator

The Report Generator communicates with the ABP Monitor over an infrared (IR) serial port. Two lines are used: one to transmit and one to receive. The port is activated by an internal magnet in the bottom of the chute on the Report Generator. This port is capable of baud rates up to 9600 bps.

Control Panel Key Logic

The processor periodically and sequentially scans the control panel keys to determine if any are being pressed. This is determined by whether a key is logic high (+5 V) or low (0 V) when the key line is read.

Internal Thermal Printer

The CPU controls the thermal printer by sending information to a buffer that feeds data lines to the hot dot drivers. The motor control comes directly from the processor and goes to a motor drive circuit that is capable of providing the power required to drive the motor. Motor rotation and hot dot head position signals from the printer are conditioned and sent on to the processor fur use in controlling the printer. The signals from the printer are conditioned and sent on to the processor for use in controlling the printer. The motor rotation signal is a crude sine wave that is turned into a square wave for use by the processor for synchronization.

Power Input

Power is provided from a wall transformer that provides unregulated +9 volts DC at 800 mA into the rear of the Report Generator. This unregulated +9 VDC input voltage is filtered, and part of it is stepped up to +12 VDC. It is then sent to the internal circuitry through three regulated power supplies:

- +5 V provides power to analog and digital circuitry.
- +5PV supplies power to high-current sources such as the printer.
- +12 V used to program the Flash ROM.

RAM/ROM

Program execution is dictated by the software on the Flash ROM and the microprocessor ROM. The RAM performs two functions:

- holds patient data and variables during operations
- holds graphic images and other information used during the creation and printing of a report

All functional modes are programmed by means of an internal 256-KB Flash ROM, which performs the following functions:

- holds the software necessary for each operational mode
- holds 8 KB of internal microprocessor code
- contains the software for the 90207 ABP Monitor
- contains phrases in five languages

The software for the monitor can be downloaded from the Report Generator if the code in the monitor's RAM needs to be updated.

ROM Card/Data Card

Two types of cards can be inserted into the card slot on the front of the Report Generator:

- A SRAM data card that holds patient data retrieved from ABP monitors is used for storage or for printing at a later time. This type of card can be write-protected to prevent accidental erasure of data.
- A Program updated card is used to update the Report Generator program in the Flash ROM and also the most current ABP Monitor code.

Real-Time Clock

The Real-Time Clock is used for the following functions:

- storing the current time and date used in resetting the ABP Monitor during initialization and for the printed report
- storing settings used in initialization

The Real-Time Clock has a battery backup so that the time or program settings are not lost after programming. The clock also stores calibration information for controlling the hot dot intensity during printing.

Central Processing Unit (CPU)

The CPU (comprised of a microprocessor used in conjunction with the ROM and RAM and the addressing logic) performs the following functions:

- executes the software stored in the flash ROM memory or microprocessor ROM
- stores, retrieves, and processes data
- controls the thermal printer for printing ABP reports and user messages
- scans the front panel keys and takes action when a key is pressed
- communicates with the ABP Monitor by using the infrared serial port in the monitor chute, communicates with the Real-Time Clock, and communicates with the serial port and the data key parallel I/O ports
- downloads software from the ROM program card and programs it into the Flash ROM
- transfers data from the ABP Monitor to the optional data card

The processor initially executes its instructions from the ROM internal to the microprocessor. If the self-tests are passed, code can then be executed out of the Flash ROM. The processor can write to the I/O devices by means of latches and buffers tied to the processor's bus and with the microprocessor's I/O ports. The processor interfaces with the following devices:

- memory (microprocessor internal ROM, Flash ROM, plug-in data card RAM or Program update card ROM, and main board RAM)
- printer
- ABP Monitor (through the IR serial port)
- Real-Time Clock (located on the main board)

Block Diagram

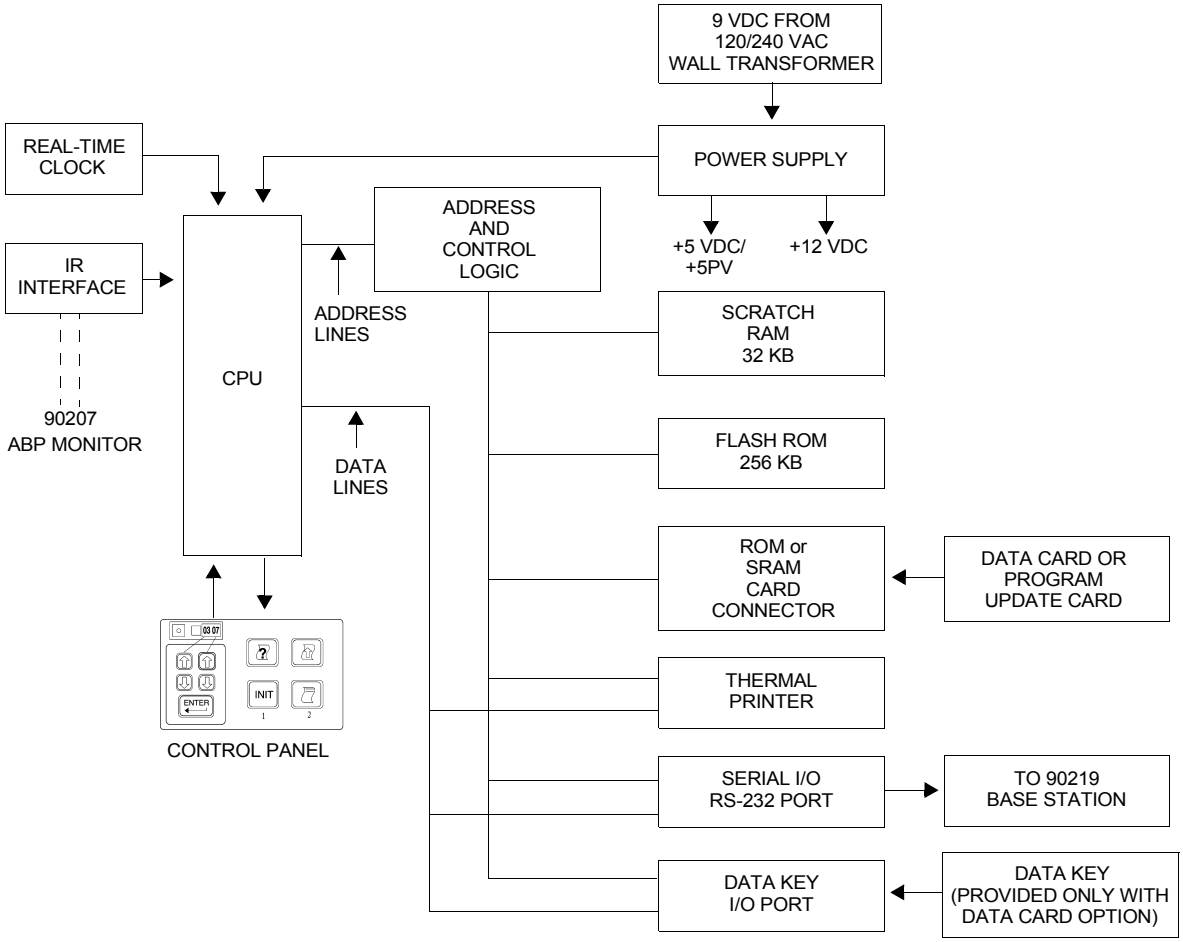

Figure 3-1: 90239A Report Generator

Routine Maintenance

Cleaning

The following steps should be performed on an as-needed basis:

- Wipe all external surfaces with a damp cloth. Ensure that no dust, lint, etc., obstructs the infrared window in the bottom of the chute.
- Remove the printer cover and vacuum out accumulated dirt and paper fiber from the print head area. Use tweezers to remove paper scraps.

Troubleshooting

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Main Board/Printer Unit

The Report Generator should print out header information (software version, the current date, etc.) at each power-up to indicate a functioning main board and printer unit.

If the header information doesn't print at power-up, replace the printer unit first, then the main board.

Control Panel

If the Report Generator does not respond to certain control panel commands, check the continuity for the keys by using an ohmmeter across the J2 plug pins. Pin 1 is indicated on the plug by the small triangle molded into the plastic.

Control Panel Key	Continuity Between
Left UP arrow	Pins 1 and 2
Left DOWN arrow	Pins 1 and 5
Right UP arrow	Pins 2 and 4
Right DOWN arrow	Pins 4 and 5
ENTER key	Pins 1 and 7
HELP key	Pins 2 and 3
INIT key	Pins 5 and 6
LINEFEED key	Pins 6 and 7
PRINT REPORT key	Pins 7 and 8

Error Messages

Error messages print whenever a fault condition occurs during operation of the Report Generator. These messages take one of the following forms:

- Interface Fault “n”
- Hardware Interface Fault “n”
- Error “n”

“n” represents one of the error numbers in the following table:

Error Number	Explanation and Possible Causes	Printed Message
2	Serial time-out (the 90207 ABP Monitor and the Report Generator failed to interface). Low batteries in 90207 ABP Monitor. 90207 monitor removed before data was fully read out.	None
3	The 90207 ABP Monitor failed to understand instructions from the Report Generator. Low batteries in 90207 ABP Monitor or bad LEDs in Report Generator. 90207 ABP Monitor misaligned in chute.	None
4	The 90207 ABP Monitor failed to give any response. Low batteries or bad LEDs in Report Generator. 90207 ABP Monitor misaligned in chute.	None
5	Maximum retries exceeded. Defective 90207 ABP Monitor. Defective infrared LEDs in Report Generator.	None
6	Bad 90207 ABP Monitor RAM. Refer to the *90207/90217 Ambulatory Blood Pressure Monitors Operations Manual* (P/N 070-0137-xx) for instructions.	Low batteries. Monitor RAM fault.
7	The Report Generator does not detect the 90207 ABP Monitor in the chute. Try reinserting the monitor into the chute. Bad lithium battery in 90207 ABP Monitor. Infrared LEDs on main board may be misaligned. Missing magnet on main board. Bad main board.	None
8	Low battery or bad clock chip on main board. Try resetting the clock. Bad lithium battery on the main board. Bad main board.	90239A Hardware Fault 8.

Error Number	Explanation and Possible Causes	Printed Message
9	Aborted printing the report. Bad control panel. Bad main board.	Print report aborted.
10	Aborted printing the Help menu. Bad control panel. Bad main board.	Print help aborted.
11	Aborted printing the data card summary. Bad control panel. Bad main board.	Print card summary aborted.
12	Power was removed while updating the Report Generator software or the update card was pulled out prematurely. Bad main board.	None
13	The 90207 ABP Monitor contains no data. Bad 90207 ABP Monitor.	Monitor contains no data.
14	Setup data checksum error. Bad control panel. Bad main board.	Setup data checksum error. Resetting all menu item values to factory defaults. Following is the current date and time. Verify and correct if necessary.
15	Invalid time received from clock. Bad control panel. Bad main board.	Invalid 90239A time or date detected. Please reset time and date.
16	Switch on data card set to write-protect. Bad data card. Bad main board.	None
17	The data card is full. Bad data card. Bad main board.	None
18	The data card is not formatted. Refer to the *90239A Ambulatory Blood Pressure Report Generator Operations Manual* (P/N 070-0399-xx) for formatting instructions. Bad data card. Bad main board.	None
19	The data card has suffered a failure while printing data. Bad scan report on data card. Reformat the card. Bad main board.	None

Error Number	Explanation and Possible Causes	Printed Message
20	Unknown or write-protected card. Turn write protection OFF. Bad data card. Bad main board.	Card is unrecognized or write protected.
21	Bad password. Try removing batteries from the 90207 ABP Monitor, then replacing them. Then reinitialize the monitor if using the 90219 ABP PC Direct/Base Station. This erases any data currently stored in the 90207 ABP Monitor.	Monitor has a different password. Cannot unlock monitor.
22	No lithium battery. Bad lithium battery in 90207 ABP Monitor.	Missing lithium battery.
23	Lithium battery low. Bad lithium battery in 90207 ABP Monitor.	Lithium battery measures low. Replace lithium battery.
24	Paper is not feeding through the print unit. If the 90207 ABP Monitor is placed in the chute, it starts beeping to indicate a printer jam problem. After the problem is resolved, press the line feed key to print the error message.	Aborted due to printer fault. Try again.
25	The data card is not present in the card slot. Bad data card. Bad main board.	No data card present.
26	Low data card battery. Improperly installed data card battery, or bad battery. Defective data card. Bad main board.	The data card battery is low.

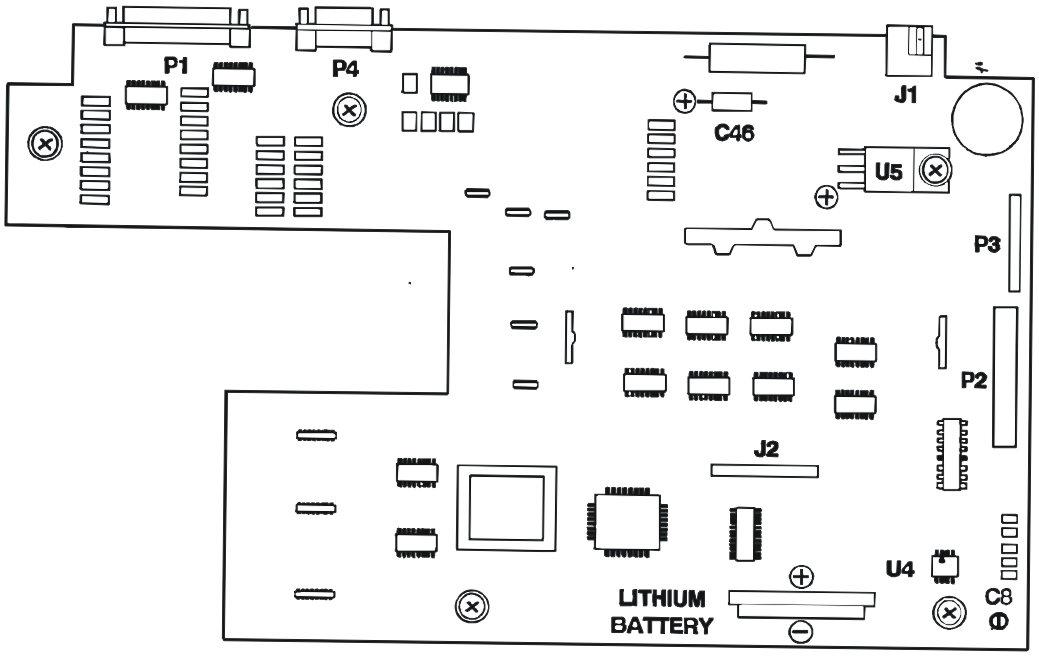
Additional Error Messages

The following error messages can also print. Because these errors are not identified in the normal program flow, they do not have error numbers.

Error Number	Printed Message	Possible Causes
None	Monitor software fault. Loading monitor software. 90207 V xx.xx.xx. Monitor software successfully installed in monitor.	Possible problem with 90207 ABP Monitor. Bad main board.
None	AA batteries measure low. Replace batteries if they are alkaline. Verify they have been fully charged if they are NiCads.	Bad batteries in 90207 ABP Monitor. 90207 ABP Monitor erroneously reading battery charge as low.
None	Software on update card is incompatible with system software in 90239A. Update not performed.	Bad update card. Bad main board.
None	Data checksum error.	Bad control panel. Bad main board.
None	Update card failed verification test. Update not performed.	Perform software update with another update card. Bad main board.

Repair

Refer to the board layout diagram below for component locations.



Assembly/Disassembly Procedures

Use a cross-tip (Phillips) screwdriver to complete most assembly/disassembly procedures. Externally, four Phillips screws connect the upper and lower halves of the Report Generator.

- The upper half contains the front control panel and the thermal printer.
- The lower half contains the main board and the infrared LEDs that interface with the 90207 ABP Monitor.
- Internally, three cables also connect the upper and lower halves:
  - One cable connects the control panel to the main board.
  - Two cables connect the thermal printer unit to the main board.

To disassemble the Report Generator:

1. Remove the four Phillips screws located on the bottom of the unit.
2. Separate the unit into upper and lower halves (they will still be connected together by the cables).

Replacing the Control Panel

The control panel is glued onto the Report Generator with an adhesive backing, so the entire panel can be simply peeled off. A small, flat-blade screwdriver will assist in this procedure.

After disassembling the Report Generator:

1. Disconnect the panel ribbon cable from the main board at the J2 connection.
2. Use the small, flat-blade screwdriver (or a similar tool) to pry up one corner of the panel switch, then peel it off.
3. Remove the paper backing from the new control panel, and press it into place.
4. Reconnect the cable to J2 on the main board, and then reassemble the Report Generator.

Replacing the Printer Unit

This procedure requires a working 90207 ABP Monitor.

After disassembling the Report Generator:

1. Disconnect the two printer cables from the P2 and P3 connections at the main board.
2. Remove the two Phillips screws that secure the printer mechanism to the upper cover of the unit.
3. Secure the new printer unit to the upper cover using the Phillips screws previously removed.

The Report Generator must now be adjusted to match the resistance of the new printer unit as follows; this adjustment directly affects print density:

1. Place the 90207 ABP Monitor into the chute. Use menu items 12 - 14 to reprogram the monitor to display the date 4/24/47.
2. Press the left set of UP/DOWN arrow keys on the control panel in the following order: left DOWN arrow, left UP arrow, right DOWN arrow, right UP arrow.
3. Press the left DOWN arrow key repeatedly until the right pair of digits on the monitor is one step below 00.
4. The resistance of each printer unit is indicated by the letter A, B, or C stamped on the flexible cable where it inserts into the printer. Press the right UP or DOWN arrow key until the number corresponding to the resistance letter is displayed on the monitor:
   - 1 = C
   - 2 = B
   - 3 = A
5. Press ENTER to select.
6. Reset the date on the ABP Monitor to the current date.

Replacing the Main Board

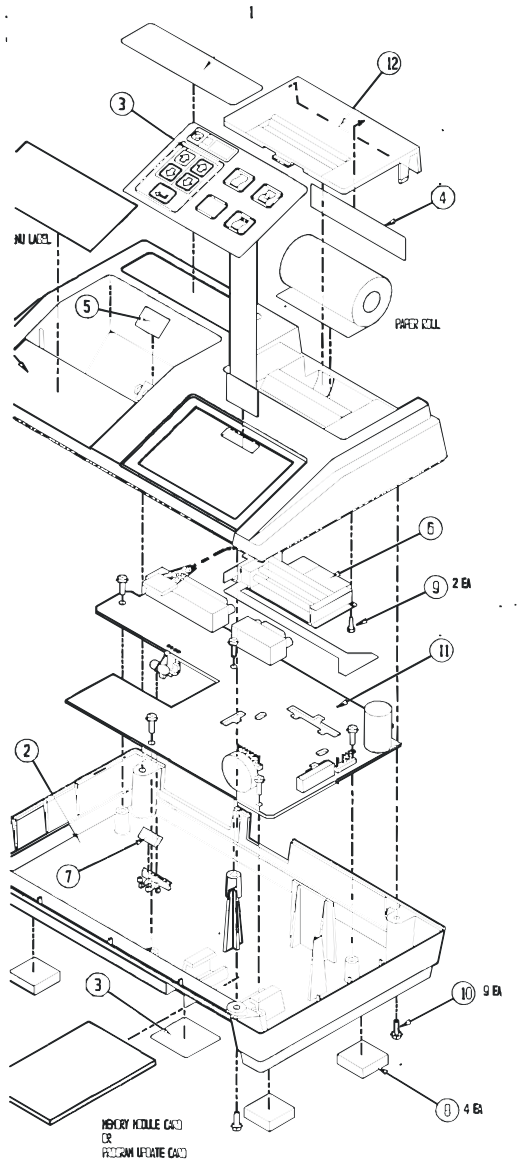
After disassembling the Report Generator:

1. Disconnect the control panel cable at the J2 connection and the two printer cables at the P2 and P3 connections.
2. Remove the five Phillips screws that secure the board to the lower half of the Report Generator. The main board can now be removed.
3. Secure the new main board using the five Phillips screws previously removed.

Reconnect the cables to the J2, P2, and P3 connections, and reassemble the Report Generator.

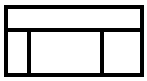
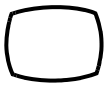
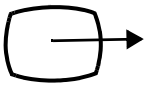
Top Level Assembly

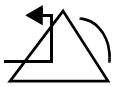
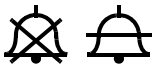
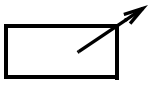
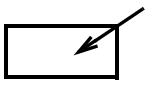
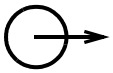
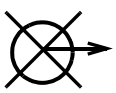
The exploded view below shows the top level assemblies for the Report Generator.

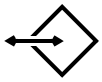
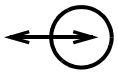
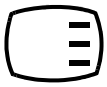
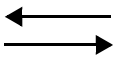
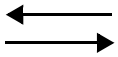
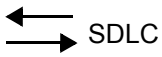
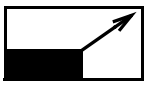
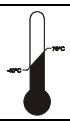


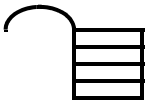
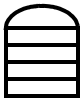
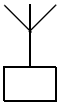
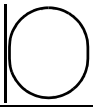
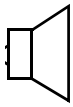
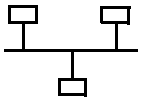
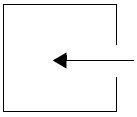
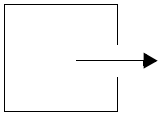
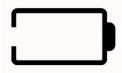
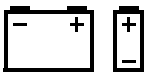
Symbols

The following list of international and safety symbols describes all symbols used on Spacelabs Medical products. No one product contains every symbol.

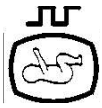
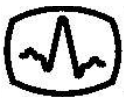
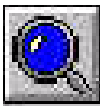
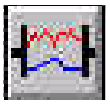
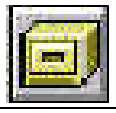
Symbol	Description	Symbol	Description
	HELP Key		Keyboard Connection
	SPECIAL FUNCTIONS Key		Mouse connection
	RECORD Key		START/STOP Key
	NORMAL SCREEN Key		START/STOP
	MONITOR SETUP Key		STOP or CANCEL Key
	ALARMS Key		CONTINUE Key
	PREVIOUS MENU Key		ENTER Key
	ON — Power Connection to Mains		OFF — Power Disconnection from Mains
	ON Position for Push Button Power Switch		OFF Position for Push Button Power Switch
	On Direction		ON/OFF
	Television; Video Display		Video Output
	ON — Part of the Instrument Only		OFF — Part of the Instrument Only

Symbol	Description	Symbol	Description
	Stand-by		STAND-BY Key
	PAUSE or INTERRUPT		Slow Run
	Reset		Power Indicator LED
	Alarm		Temporary Shut Off of Alarm Tone or Screen Indicators
	Indicator — Remote Control		Indicator — Local Control
	PRINT REPORT Key		Indicator — Out of Paper
	Partial ON/OFF		Recorder Paper
	Normal Screen		Return to Prior Menu
	Clock/Time Setting Key		TREND/TIMER Key
?	HELP (Explain Prior Screen) Key		Keypad
	Activate Recorder for Graphics		Indoor Use Only
	START (NIBP) Key		Auto Mode (NIBP)
	Output		No Output (Terminated)

Symbol	Description	Symbol	Description
	Data Input/Output		Input/Output
	Input		Reset
	Menu Keys		Waveform/Parameter Keys
	Monitor Setup Select Program Options		Set Initial Conditions Menu
	Access Special Function Menu		Return Unit to Monitor Mode
	Serial Port 1		Serial Port 2
	External marker push button connection		SDLC Port
	Arterial Pulse		Electrocardiograph or Defibrillator Synchronization
	Gas Exhaust		Foot Switch
	Enlarge, Zoom		Delete
	PCMCIA Card		Event
	Keep Dry		Fragile; handle with care
	Environmental Shipping/Storage Altitude Limitations		This Way Up
	Environmental Shipping/Storage Temperature Limitations		Environmental Shipping/Storage Humidity Limitations

Symbol	Description	Symbol	Description
	Open Padlock		Closed Padlock
	Down Arrow		Up Arrow
	Hard Drive		Power Indicator LED
	Antenna		Mermaid Connector
	Microphone		Omnidirectional Microphone
	Audio Output, Speaker		Activate Telemetry Recorder
	Network Connection		Universal Serial Bus
	Gas Sampling Port		Gas Return Port
	Remote Alarm; Nurse Alert		Nurse Call
	Battery Status		Low Battery
	Battery Replace only with the appropriate battery.		Replace only with the appropriate battery. (+ / - signs may be reversed)
	All batteries should be disposed of properly to protect the environment. Lithium batteries should be fully discharged before disposal. Batteries such as lead-acid (Pb) and nickel-cadmium (Ni-Cd) must be recycled. Please follow your internal procedures and or local (provincial) laws regarding disposal or recycling.		Caution - hazardous voltages. To reduce risk of electric shock, do not remove the cover or back. Refer servicing to a qualified service personnel (U.S.A.). DANGER - High Voltage (International)

Symbol	Description	Symbol	Description
	Protective Earth Ground		Functional Earth Ground
	Replace Fuse Only as Marked		Fuse
	Power supply jack polarity. (+ / - signs may be reversed)		Equipotentiality Terminal
	Alternating Current		Direct Current
	Both Direct and Alternating Current		AC/DC Input
A	Amperes	Hz	Hertz
V	Volts	W	Watts
	IEC 601-1 Type B equipment. The unit displaying this symbol contains an adequate degree of protection against electric shock.		Class II Equipment
	IEC 601-1 Type BF equipment which is defibrillator-proof. The unit displaying this symbol contains an F-type isolated (floating) patient-applied part which contains an adequate degree of protection against electric shock, and is defibrillator-proof.		IEC 601-1 Type BF equipment. The unit displaying this symbol contains an F-type isolated (floating) patient-applied part providing an adequate degree of protection against electric shock.
	IEC 601-1 Type CF equipment. The unit displaying this symbol contains an F-type isolated (floating) patient-applied part providing a high degree of protection against electric shock, and is defibrillator-proof.		IEC 601-1 Type CF equipment. The unit displaying this symbol contains an F-type isolated (floating) patient-applied part providing a high degree of protection against electric shock.
	Loop Filter		Adult NIBP

Symbol	Description	Symbol	Description
	ETL Laboratory Approved		Canadian Standards Association Approved
	Risk of Explosion if Used in the Presence of Flammable Anesthetics		Operates on Non-Harmonized Radio Frequencies in Europe
Note	Note		Attention - Consult Operations or Service Manual for Description
WARNING	Warning About Potential Danger to Human Beings	**CAUTION**	Caution About Potential Danger to a Device
	Noninvasive Blood Pressure (NIBP), Neonate		Fetal Monitor Connection (Analog)
	Fetal Monitor Connection RS232 (Digital)		Physiological Monitor Connection RS232 (Digital)
	Happy Face		Sad Face
	Magnifying Glass		Compression
	File Cabinet		List of Rooms
	Arrows		Printer
	Recycle		Service Message
	Radio transmitting device; elevated levels of non-ionizing radiation		

Abbreviations used as symbols are shown below.

Symbol	Description	Symbol	Description
1 - 32	Access Codes 1 Through 32	**AIR**	Air
ANT 1 **ANT 2**	Diversity Antenna System 1 Diversity Antenna System 2	**Arr1** **ArrNet2**	Arrhythmia Net 1 Arrhythmia Net 2
CH **ch**	EEG, EMG, or ECG Channel EEG Channels - CH1, CH2, CH3, CH4 EMG Channel - CH5	**cmH_2O**	Centimeters of Water
C.O. **CO** **co**	Cardiac Output	**DIA** **dia**	Diastolic
ECG **ecg**	Electrocardiogram	**EEG** **eeg**	Electroencephalogram
EMG **emg**	Electromyogram	**ESIS**	Electrosurgical Interference Suppression
EXT	External	**FECG**	Fetal Electrocardiogram
FHR1 **FHR2**	Fetal Heart Rate, Channel 1 Fetal Heart Rate, Channel 2	**GND** **gnd**	Patient Isolated Ground
HLO **hlo**	High-Level Output	**Multiview**	Multi-Lead Electrocardiogram
NIBP **nibp**	Noninvasive Blood Pressure	**N_2O**	Nitrous Oxide
O_2	Oxygen	**PRESS** **press** **PRS**	Pressure
RESP **resp**	Respiration	**SDLC**	Synchronous Data Link Control
SPO2 **SpO2** **SpO_2** **SaO_2**	Arterial Oxygen Saturation as Measured by Pulse Oximetry	**SVO2** **$S\underline{v}O2$** **SvO_2**	Mixed Venous Oxygen Saturation

Symbol	Description	Symbol	Description
SYS **sys**	Systolic	**T1** **T2** **T3** **T4**	Temperature 1 Temperature 2 Temperature 3 Temperature 4
TEMP **temp**	Temperature	**UA**	Uterine Activity or Umbilical Artery
VAC	Vacuum Connection		